HOUSE OF COMMONS
CHAMBRE DES COMMUNES
CANADA

Standing Committee on Natural Resources

RNNR • NUMBER 008 • 1st SESSION • 41st PARLIAMENT

EVIDENCE

Wednesday, October 19, 2011

Chair

Mr. Leon Benoit

Standing Committee on Natural Resources

Wednesday, October 19, 2011

● (1535)

[*English*]

The Chair (Mr. Leon Benoit (Vegreville—Wainwright, CPC)): Good afternoon, everyone. We're here today to continue our study of resource development in northern Canada.

Just before we get to the witnesses, I understand Mr. Gravelle would like to introduce a gentleman who is going be a permanent member of the committee.

Go ahead, Mr. Gravelle.

Mr. Claude Gravelle (Nickel Belt, NDP): Thank you, Mr. Chair.

I'd just like to inform the committee that Mr. Kennedy Stewart is going to be our permanent member of this committee from now on. Mr. Saganash had to leave the committee, so Kennedy is going to replace him permanently. Thank you.

Some hon. members: Hear, hear!

The Chair: Welcome to our committee. We look forward to having you here.

We'll now get to the witnesses from the Department of Natural Resources. I understand we have just one presentation today. Is that correct? So we'll be getting to questions and comments quite quickly. We have, from the Department of Natural Resources, Brian Gray, assistant deputy minister, earth sciences sector; David Scott, director, Geological Survey of Canada, northern Canada division; John Percival, program manager, geomapping for energy; and Linda Richard, coordinator, geomapping for energy and minerals.

Welcome to all of you. Thank you very much for taking the time to be here today. I'm looking forward to your presentation; then we'll get directly to questions and comments.

Go ahead, please.

[*Translation*]

Dr. Brian Gray (Assistant Deputy Minister, Earth Sciences Sector, Department of Natural Resources): Thank you, Mr. Chair.

I am neither a geologist nor a specialist in the field, but fortunately, I am accompanied today by three geology experts.

Allow me to make a presentation before the question period.

[*English*]

I'll go to page 2, a very brief history. The Geological Survey of Canada has been around for 169 years; it predates Confederation. We have not been with the organization quite that long, but some of us have had a few years in it. We provide Canada with a comprehensive geoscience knowledge base, contributing to economic development, public safety, and environmental protection. Those are the three pillars of how we operate. We acquire, interpret, and disseminate geoscience information concerning Canada's land mass, including the offshore.

We go to page 3. GEM is an acronym that we use. GEM translates in both official languages.

[*Translation*]

In French, GEM stands for "*géocartographie de l'énergie et des minéraux*".

[*English*]

In English it's geomapping for energy and minerals. So if it pleases you, I will use the acronym GEM for the remainder of the presentation.

[*Translation*]

The GEM program is part of the third pillar of Canada's Northern Strategy which is to promote social and economic development so that northerners have greater control over their destiny. By providing new knowledge on land and water, GEM will identify the energy and mineral resources potential in the north that will allow industry to target its activities while also helping to provide better employment opportunities for northerners. The GEM program provides fundamental geoscientific knowledge to support informed land-use decisions that will have an impact on resource development in the north.

On page 4, we learn that in 2008, Prime Minister Harper announced that the federal government would invest in the GEM program. We are in year four of a five-year program that is part of an ambitious plan to complete the geo-mapping of the north to modern standards. The program promotes economic growth and reinforces Canada's competitiveness in the worldwide search for resources.

As part of Canada's Economic Action Plan, GEM accelerated its ambitious airborne geophysical data acquisition project that helped to sustain the geophysical services industry during the economic downturn and resulted in investment optimization. Because data were released within six months of collection, industry quickly showed a great deal of interest.

[*English*]

On page 5, the main points I'd like to make are the collaboration among the provinces, territories, the federal government, and our stakeholders. I understand that ADM Anil Arora was in front of this group a couple of weeks ago, so he's covered most of this.

I would like to draw your attention to the shared responsibilities, the box in the middle. Under the shared responsibilities, the intergovernmental geoscience accord is a ministerial-level agreement on roles and responsibilities. It sets principles for collaboration, and the ideas of these shared responsibilities include management of common data and information.

The first IGA, or intergovernmental geoscience accord, was signed in 1996 and it's a five-year accord. The most recent was signed in 2007 and will be renewed in early 2012.

The second point I want to draw your attention to is the advisory group of northerners. This group provides advice to the GEM program from a northern perspective regarding community engagement during project development and planning, delivery, and communications of results. It includes representatives from aboriginal communities and associations, territorial governments, education institutions, and the northern exploration community.

If we can move on to page 6, this map represents a starting point for the GEM program in 2008, and there are three points I'd like to make on the slide. The first, if you have colour copies, is the green area, and if you don't have a colour copy it would be the darker, shaded area. These areas prior to the GEM program had enough geological information for industry to engage in exploration and development.

The areas in what I'll call purple—I don't know quite what that colour is but the other colour that's not green—are areas we did not have adequate modern geomapping for. The second point about that purple-coloured area is that it represents about 60% of north of 60. So about 60% of the area had not been mapped to modern standards before this program.

The third point is, as you would expect, that most of the known resource potential, most of the mining activity, has occurred and is in the process of occurring in those green shaded areas because there was adequate information for industry to take the risk to explore and to develop.

So we can move to page 7. What I've tried to do here is make the point that we did not intend to map the remainder of this 60% in this five-year process. We took the best available information. We worked with the industries, we worked with the advisory groups, and we targeted areas based on proximity to known resources or based on our collective expert knowledge, and these areas we depicted in ellipses are the areas we targeted for the GEM program.

You could see another point here: the broad geographic distribution of GEM projects reflects the geological diversity of Canada's north and corresponding potential for a wide variety of mineral and energy resources. This is a vast area to survey. The current range of investigations is contributing to the identification of new gold and precious metals, diamond-bearing kimberlites, accumulations of oil and natural gas, uranium, as well as base metals such as copper, zinc, nickel, iron, and lead.

Our work is also uncovering the potential for less common deposit-like types that include the rare earths or high-tech metals.

Later in this presentation I want to walk through three examples of where we've gone in, what the situation was before and after, and the industry uptake. If you look on page 7, there are three red stars. Those are the three examples I'll walk you through in a couple of slides from now.

Turn to page 8. As I said, the Geological Survey of Canada is an old institution. The first true geological mapping of the north started in the 1950s, and this was led by the availability of technology. For the first time there were light helicopters and light fixed-wing aircraft that could land directly on the tundra or on the ice. Applying these techniques to mapping was a great leap forward.

● (1540)

Just prior to this technology, we really couldn't get up there to explore. These major operations were basically a case of geologists going up for a long period of time—essentially spending the summer up there—and heli-hopping from one area to the other, or “heli-traversing”. In these areas they made direct observations, and then they would get up and fly ten or fifteen kilometres and make other observations. It was really a reconnaissance-level mapping exercise, using the best technology at the time.

I'd like to emphasize that in the 1950s through the early 1970s, when they were doing this, this was state of the art. We were at the frontier internationally in this geological science. If you look back on it now, it looks fairly simplistic or primitive, but I want to assure you that at the time, in the day, this was innovative, ground-breaking stuff. And many of our scientists put their lives on the line, because it was very precarious to go heli-hopping for a summer up there.

That's a little bit of history. Now we move to page 9.

These are the technical advances. Today we use modern tools to collect and distribute information beyond the typical bedrock geology mapping. So we are better understanding through evidence.

The modern mapping methods provide digital information distributed freely via the Internet. For example, here is some of the technology we're using: airborne geophysical surveys measure physical properties of the bedrock from the aircraft, such as a helicopter or a light fixed-wing aircraft; the aircraft flies back and forth over the land along parallel lines spaced about 400 metres apart, and the aircraft is about 150 metres off the ground. Down on the field level, we have field data collected by geologists using hand-held devices with pinpoint GPS accuracy. In the old days it was a case of “march 20 paces north of this area and 20 paces to the left, and you'll find....” This is pinpointed to the centimetre.

We also have, back here in Ottawa, modern laboratory work, which is done in the Geological Survey's research lab, such as the sensitive high-resolution ion microprobe lab, also known as the SHRIMP lab. That is truly a marvel of science, that lab and what they can do there.

At the far side of page 9 you'll see several layers of maps. What we're trying to depict there is that this includes layers, including the bedrock geology, which was the only layer of information we had previously. Now we're looking at surficial geology, at geophysics, geochemistry, geochronology, and mineral showings.

The first example I have, on page 10, is from southeastern Baffin Island. To orient you, if you look in the upper left-hand corner, that's Pangnirtung, I believe.

There are a couple of points to make on this slide. GEM tackled this remote and unexplored part of Cumberland Peninsula of eastern Baffin Island, where the knowledge base was rudimentary. What you're seeing on the slide is essentially provided from the survey work that was done in that first tranche from the 1950s through the 1970s. Few details were available on this bedrock geology map. This is essentially the "pre-" data that we had before GEM. Historically, up until the GEM program, there had been very little exploration activity in this region by the private sector.

Let us go to page 11. The new geological database was acquired through targeted fieldwork, geophysics, and analytical support in 2009 and 2010. This integrated map, produced from multiple layers of information, reveals a geological framework completely different from what was expected from the sparse information you saw on the previous page. The mineral potential now can be properly assessed based on a comprehensive understanding of the geological environments of Cumberland Peninsula.

The knowledge upgrade is published and fully available. We release the information simultaneously to the public in what we call open data files. To create the information based on the science that was done here we created 24 open data files, which included 18 geophysical maps, three geological maps, and three geochemical data releases.

Moving from that to the next slide, page 12, within months of GEM's presentation of this information via the open files I just mentioned, technical reports, and presentation by our scientists at professional conferences and trade shows, the entire area was acquired under prospecting permits for diamond, gold, and base metal exploration.

● (1545)

Active exploration programs operated in 2010 and this year, and to date approximately $670,000 has been invested by the exploration company in the Cumberland area.

I pointed out Pangnirtung. We also had the Pangnirtung residents involved. We trained some and employed some in the GEM program. They were involved in that program, and my understanding is that some of these folks are involved with the industry exploration programs.

[*Translation*]

And so, we find a second example on page 13. The words "rare earth" refer to a particular group of metals whose properties can be used in high-end technology applications such as semi-conductors, cell phones etc.

The Strange Lake rare earth deposit located in a remote area east of Schefferville was discovered long ago but its enormous regional potential had remained unknown until now.

Before GEM, regional data on the area south of the Strange Lake deposit was insufficient to allow industry to discover new sites.

Nevertheless, we estimate that there is great resource potential in this area. The provinces of Quebec and Newfoundland and Labrador have a joint project to collect layers of geoscientific data on the underexploited region east of Schefferville, in Quebec.

GEM's contribution has taken the form of a series of high resolution data obtained by airborne geophysical survey and published March 8, 2010. The survey revealed that the Strange Lake area that had already been identified as being mineral rich extended south. Ultimately, 46 public records were released.

GEM has created a modern geoscientific database that quickly attracted great interest in the industry. Soon after the release of the data, a prospector detected an anomaly at Michikamat and the same week, he staked off the area. On April 6, 2010, the prospector sold his mineral rights to the Fieldex Exploration Company. This is a Quebec-based mining company specialized in rare earth elements. The anomaly was detected because of our data.

Soon after, a second company, Midland Exploration, acquired the mineral rights in another area in which important rare earth elements, named Ytterby 4 by the company, were found.

Evidence of the mineralization of rare earths is thin. Concentrations as low as 1% can have high economic potential. Companies use various means to target geophysical and geological exploration activities in the bedrock, geological and geochemical exploration activities on the surface and finally, geochronological exploration activities.

Our partners, Quebec and Newfoundland and Labrador have, for their part, contributed other types of data, for example, geological maps, and geochemical and geochronological data.

● (1550)

[*English*]

We'll move to page 15. The third and final example is western Melville Peninsula. This is an area of nickel potential.

Now, the previous sporous bedrock geology data for Melville Peninsula did not provide an adequate base for mineral exploration. GEM undertook regional mapping in a large area of prospective units with high nickel potential, which was identified based on new comprehensive bedrock geology, geophysics, geochemical, and geochronological information.

Finally, industry has responded quickly, including the mining giant Vale.

We will move to slide 16.

The integration of multiple data sets led to the identification of a geological environment of the right age and composition on a regional scale to host nickel deposits. Prospecting permits were acquired for a large area of western Melville in February of this year, following the release of GEM products late in 2010.

A new set of mineral claims was staked in August as a result of 2011 industry field work. The entry of global nickel powerhouse Vale in this region is attributed to GEM's identification of the previously unrecognized potential of nickel deposits on the west coast of the peninsula. Their interest is a strong signal that this region has a significant upside potential.

I will move on to page 17.

Working with northern suppliers is a priority for the GEM program to ensure that whenever possible the services of northern companies and individuals are employed to help carry out our work. It's common sense. These are people who know the area, know the terrain, and have the equipment to do the work. Commonly used services we've listed there include transportation—air and ground, but quite a bit of it is air, and it's very expensive, as you can imagine—logistics, fuel, wildlife monitors for our programs, field assistants, food and camp supplies, local accommodations, professional services, etc.

We depend on people who live and know the north to provide our logistical support for field operations. In doing so, we are providing direct benefits, we feel, to the communities as well as preparing these northerners for future economic opportunities.

● (1555)

[*Translation*]

We now turn to page 18.

In collaboration with Canadian universities, GEM is preparing the next generation of geoscientists who are already gaining experience in the north.

Thanks to the research affiliate program, dozens of students are contributing to and benefiting from GEM's work.

GEM also strives to employ members of local communities while contributing to the establishment, in the north, of a group of skilled workers in the fields of geo-mapping and mining exploration and exploitation.

Let us now turn to page 19.

Thanks to its modern geoscientific database, GEM is promoting the exploration of new regions in the north. GEM's accomplishments are presented in Appendix 1.

We are constantly discovering new regions whose resource potential has remained unknown until today. Because of GEM, northerners are able to make informed decisions concerning their economic and social future.

In the longer term, other important advantages will result from subsequent job creation in the private sector as well as from sustainable economic development. For example, geoscientific data that had been released in the past were a deciding factor in the exploitation of the Meadowbank mine in Nunavut.

We expect the GEM program to have other similar impacts in the future.

Mr. Chair, my presentation is over.

Thank you very much.

[*English*]

The Chair: Mr. Gray, thank you for your presentation.

Today we have Garry Breitkreuz, who is the member for Yorkton—Melville. When I saw mention of the nickel deposits on western Melville Island, I know he was already figuring out how he was going to annex it, because of the name.

There's a colour-coded map on page 11 and there is colour coding on some other pages too. Could you quickly explain what the colour coding means, on page 11, for example?

Dr. Brian Gray: Yes, it's specific to the map. I'll turn it over to John, who's the right person for the colour coding.

Mr. John Percival (Program Manager, Geomapping for Energy, Department of Natural Resources): The colours correspond to different rock units. It's the product of our geological mapping. We identify the rocks. The substance of geological maps is to identify the types of rock units.

The Chair: It's the actual rock units. Thank you very much.

We'll go directly to questions and comments.

Mr. Trost, you have up to seven minutes, please.

● (1600)

Mr. Brad Trost (Saskatoon—Humboldt, CPC): Thank you, Mr. Chair.

Thank you to the witnesses for coming here.

I'm going to start with some general questions, and then as we go on they'll become more defined.

I note that you said "when we get to sufficient mapping". I thought it was an interesting turn of phrase. I remember what my structural geology professor taught me when he taught mapping. He said no geological map is ever a hundred percent right, including ones that he had produced. There's never a point where we're a hundred percent sure on everything.

I understand that a project gets to a point where the private sector takes over. I would say it's sufficient and it's proven by an economic test. But how do we decide and allocate what is sufficient? It would be helpful to decide if this program needs to be continued past 2013. What is the test you use to decide when it's sufficient and when it can be turned over to the private sector to do more in-depth surveys and mapping?

Dr. Brian Gray: I'll start. It's an excellent question.

In the examples we gave we tried to highlight the fact that there had not been exploration in these areas. We obviously felt there was sufficient information on these three examples where the risk was less risky. Industry then went in and did some exploration.

We're in year four of a five-year program. We are in the process of evaluating the uptake. I may be wrong, but I don't imagine that every one of these areas will have a rapid uptake.

On the logistics of working in the north, unlike the south, there are no roads. You can't drive to these places. You organize the logistics to get to these places, recognizing that you're working against mother nature all the time and recognizing that it's dark for six months of the year in many of these places.

Mr. Brad Trost: But how do you determine the criteria for what is sufficient?

Mr. David J. Scott (Director, Geological Survey of Canada Northern Canada Division, Department of Natural Resources): Thank you.

The degree to which the resolution is sufficient is really one that comes from our experience in providing regional or framework scale maps, as we call them, across the north and in the southern parts of the country.

Our experience has shown that preliminary maps, where direct observations were made every several kilometres or tens of kilometres, will guide us to the basic building blocks. For industry to step up, they need to be able to test hypotheses without leaving their offices. Each type of mineral deposit or energy deposit has its own recipe, if you will. If they can't see the building blocks of the recipe in existing public maps, it's difficult for them to make a business case to go there to explore.

Our experience has shown that we need to provide direct data and direct observations every kilometre, every half a kilometre, or every few hundreds of metres. It allows us to illustrate the geology in sufficient detail for private sector explorers to put a hypothesis together that's backed by a business case that investors will fund for them to go to a basically unexplored area with sufficient resolution to test a specific hypothesis about a shear zone-hosted gold deposit or a particular type of zinc deposit. It's based on our experience.

I suspect your geology professor was correct. You can always go back to look and add more detail. Our maps are interpretations. They're not absolute fact. You can go back and zoom in forever. We have to draw the line at a particular scale. It's the threshold where industry can step up and make private sector investments in development.

Mr. Brad Trost: That's when they would send people like me into the field.

What I also want to know is this. It's been pointed out that the knowledge of geology is a strategic advantage. Compared with other major countries in the world, what does our level of mapping or expertise from the Geological Survey, projects like GEM, and our public database of geological information give to Canada when it comes to attracting mineral investment, against countries like Russia, Australia, Africa, or Latin America? Could you comment on that? What's our comparative advantage in light of this?

● (1605)

The Chair: Go ahead, Mr. Scott.

Mr. David J. Scott: Thank you.

Geological knowledge and its public availability is one of the factors. Others include political stability and certainty of economic rights, mineral rights that won't disappear with the government.

Mr. Brad Trost: Are we competitive with other first world countries? Are we better than other first world countries? How much of an advantage does this give us against places like Africa, where they do not have well-developed national geological surveys?

Mr. David J. Scott: I would suggest that we're somewhere in the middle. Our main competitive countries are places like Australia and Mexico, where the state of adequate geoscience knowledge is advanced relative to Canada's. We're further ahead than many other countries. But owing to the sheer size of Canada and the logistical difficulties of working in remote areas of the country, particularly in the north, we're not quite where we need to be from a private sector investment perspective.

The vast majority of the rest of Canada is covered to more or less adequate standards for investment. The remaining part of Canada is not yet up to that standard. Where areas are up to standard, we have seen significant private sector investment, including from the international community. We've seen significantly less exploration investment, sometimes none, in those inadequately mapped areas.

So I think there's a fairly good correlation between the degree of adequate mapping in the public domain and the ability to have that risk factor removed from the overall equation. The knowledge risk is what we buy down with our geological mapping.

The Chair: Thank you, Mr. Trost.

We go now to the official opposition and Monsieur Gravelle.

Mr. Claude Gravelle: Thank you, Mr. Chair,

I'm glad you are here, Dr. Gray, because at our last meeting your name came up several times as the only person who could answer the questions I'm about to ask. I hope that person was correct.

Dr. Brian Gray: So do I.

Mr. Claude Gravelle: My first question concerns the $100 million over the next five years for geomapping. Can you break that $100 million down, and can you tell us who is getting what and how much?

Dr. Brian Gray: First of all, let's look at it as an annual expenditure over the five years. Our projected budget for 2008-09 was around $11 million. We ramped up in 2009-10 to $26.5 million. In 2010-11, it was $20 million. This fiscal year it's projected to be $17 million and then $17 million in 2012-13.

The figures I'm going to give you now aren't precise, but in expectation of this question, we did the best we could. The plan for GEM was to apply about 75% of the expenditures north of 60 and about 25% south. In the Yukon, the total expenditure over the course of this five years will be $15.6 million of the $100 million; the Northwest Territories, $26.4 million; Nunavut, $38.6 million; British Columbia, $1.7 million; Quebec, $2.9 million; Newfoundland and Labrador, $2.3 million; Saskatchewan, $1 million; and Manitoba, $1.2 million. These are the best estimates I can get you at this stage.

Mr. Claude Gravelle: Can you give me the current status of the program's development and findings today?

Dr. Brian Gray: Yes. If we turn to the annex, appendix 1, I gave you three examples of projects where we released the open data files, which include chemistry information, traditional sorts of geomapping, bedrock geology, and include surficial geology. Those three, collectively, are about 114 open files. To date, we have released 424. What we've just walked through is about a quarter of what we've released to date. But we are at the end of the fourth field season. I'll have to turn to Linda or John, but I would expect we have a lot of releases that are going to be happening following this field season.

John.

● (1610)

The Chair: Mr. Percival, go ahead.

Mr. John Percival: That's correct. It takes, in some cases, years to generate a final product, and some of those are starting to emerge now after a couple of years of field work. We're expecting a wave of new releases in the near future, so during the final 18 months of the GEM program we'll be producing all of those final reports and maps. So I expect a wave of new information coming out shortly.

Dr. Brian Gray: In this we also have presentations that we've made. Often they'll give a presentation at a conference before the final release of the data, so here's the information we're gathering, our inference, hypotheses, etc.

Mr. Claude Gravelle: I don't have much time left and I have another couple of questions.

Are there other locations where NRC is using seismic testing in the Arctic? There was much controversy in 2010 over the government's plan for seismic testing in Lancaster Sound. Communities were worried, not only about the effects of seismic blasting on marine life, but also there was the perception that the government was mapping oil and gas deposits within an area that was supposed to become a marine conservation area.

In 2010, Minister Baird announced that all the testing had been cancelled. Can you tell me if there are any current plans for new tests? If there are, what measures have been taken to protect the marine life and what consultations have been conducted with communities?

Dr. Brian Gray: The only seismic work that was being conducted this summer in the Arctic that had anything to do with the federal system, whether it's our group or any other federal department, was the UNCLOS program, the United Nations Convention on the Law of the Sea. The *Louis S. St-Laurent*, the icebreaker, was up mapping the final bit of the northwest part of the Arctic, fairly close to the North Pole. They were doing that in tandem with the United States icebreaker, the *Healy*. That is the only seismic work that was going on.

The mitigative process that we have in place on the seismic work is out of caution. We shut down the seismic operation if a marine mammal is within one kilometre of the *Louis S. St-Laurent*. We have three wildlife spotters—these are all northerners—who are part of the seismic work. They are up on the top of the ship looking for wildlife any time there's a seismic operation going on. If they spot any, the operation shuts down until that marine mammal is out of the one-kilometre zone.

Mr. Claude Gravelle: Can you tell me how long they would wait for this mammal to leave, or how long does it take?

Dr. Brian Gray: I would imagine as long as it takes, if the rules are they have to be a kilometre away. I don't know.

Mr. Claude Gravelle: All right, thank you.

I'll pass the rest of my time.

[*Translation*]

The Chair: Thank you Mr. Gravelle.

[*English*]

Mr. McGuinty, up to seven minutes.

Mr. David McGuinty (Ottawa South, Lib.): Thanks, Mr. Chair.

Thank you very much for coming.

I am going to continue to ask and explore questions I began last meeting to try to understand how the work you are doing here links to Canada's overall responsibilities and commitments on greenhouse gases.

I didn't hear the words, Mr. Gray, in any presentation. In fact, they are not in print. I didn't hear the words “climate change” or “greenhouse gases”. Canadians understand that the magnitude of opportunity in Canada's north and Canada's south is remarkable when it comes to natural resources. We all understand that. We are looking at $2 billion alone for drilling investments in the Beaufort Sea, despite the fact that we haven't got a proper boom system to contain any kind of spill. But that's another issue.

I want to get as much insight as I can from you and your team. You are doing a lot of fabulous work and mapping. You are basically identifying the magnitude of opportunity and to a certain extent the challenges inherent in exploiting these resources.

I am trying to overcome what is a continuous fiction in Canada, and particularly with this government, that you can dissociate, for example, our responsibilities with greenhouse gas reductions and this massive investment in resource exploitation.

You talked about an advisor group of northerners. You talked about aboriginal communities. In preparation for this meeting, I was just leafing through the circumpolar Inuit declaration on resource development principles in Inuit Nunaat, in which they described climate change under the terms of global environmental security. They go on to talk about it in great detail, which reminded me of the chairman of the United States Joint Chiefs of Staff, who, relying on CIA and military research, gave a major speech two years ago in Washington and declared climate change was the number one threat to global security going forward.

I'm trying to get a sense of how your work connects, for example, with the government's promise that in eight and a half years we're going to reduce overall greenhouse gas emissions by 17% from 2005 levels. That is question number one. Is it connected? What overarching influence does that commitment have on your work and your good investigative research to explore and find all of this opportunity for us? To what extent is it connected? Do you have a connection? We have no national energy strategy in the country, despite the calls over and over by CAPP and other oil and gas producers, for one. It puts you in a tough spot, but how are you linking this in your good work? Or are you?

● (1615)

Dr. Brian Gray: I don't think I am the appropriate ADM to be responding to your question on the 17% or how this links to the overall government's response to the 17% target. I can tell you that within our department we are developing plans to ensure, as best we can, that our energy use within our buildings and laboratories, as well as our travel, meet the government's objective of 17%.

I can tell you about the climate change impacts and adaptation group we have within my sector that is working with provinces to make Canadians aware of a changing climate so that they may develop and use adaptive tools and so that we can actually adapt to a changing climate to save lives and money.

We also have a climate change geoscience program that is actually working in the north looking at the effects of a changing climate on infrastructure. Whether it's hard infrastructure for development, housing, or roads, these are the experts who are looking at how a changing climate.... As you know, this is an area that is changing faster than any part of the country. They are looking at how this is affecting permafrost, ocean activity, shorelines, and future development.

That information is very useful for providing northerners with information and tools so they can build infrastructure and their future and understand how to adapt to a change in climate.

Mr. David McGuinty: Mr. Gray, who might we turn to, then? At the last committee meeting we had some really fabulous folks who were involved in a new department that was set up to overcome departmental barriers and regulatory hurdles, in order to facilitate the closing of deals in Canada's north. It is a noble aspiration. I asked the same question, and they said they don't deal with the climate change plan; they don't raise it, necessarily, with folks who come in and ask for help navigating the regulatory hurdles of the federal government.

In your work in geoscience mapping...you touched tangentially on another initiative, which is looking at the effects of climate change, which is not part of—

Dr. Brian Gray: It's not part of this, but it's part of—

Mr. David McGuinty: Help us understand as a committee where we turn in terms of government responsibility for the overarching... how these things all connect, the knee bone connecting to the thigh bone, under the auspices of this larger commitment and promise. Where do we turn?

Dr. Brian Gray: I'm just the humble ADM of their science sector.

Mr. David McGuinty: Would it be the PCO, the Prime Minister's office, or do you think it would be...?

Dr. Brian Gray: I can't give you an informed response on that. I don't know.

Mr. Richard Harris (Cariboo—Prince George, CPC): Environment Canada.

● (1620)

Mr. David McGuinty: My colleague says Environment Canada, and that's where he's so badly mistaken. In so many jurisdictions now we're seeing that G-20 countries are merging energy and environmental portfolios. They understand that 86% of all greenhouse gases created in this country come from digging up fossil fuels, transforming them, and consuming them.

I'm going to continue to probe and ask tough questions about how this all connects. We massively invest in the north, which has tremendous opportunity for Canadians in terms of jobs and wealth, but we're pretending that the greenhouse gas challenge doesn't exist.

I'm trying to connect all of these pieces, and, Mr. Gray, I'm not putting you on the spot. You and I have a long working relationship going way back. I'm just trying to see how this comes together.

How is my time, Mr. Chair?

The Chair: Your time is up, Mr. McGuinty.

Mr. David McGuinty: Thank you very much.

The Chair: We'll go to the five-minute round, starting with Mr. Lizon.

Mr. Wladyslaw Lizon (Mississauga East—Cooksville, CPC): Good afternoon.

I would like to thank the witnesses for coming to the committee this afternoon.

The first question I have is about methodology. What methods are you using in this program in geomapping, mainly?

Mr. John Percival: We use a variety of methods.

Probably the largest activity on a cost basis is airborne geophysics. It's a process whereby an aircraft flies and collects measurements from the air. It provides a seamless image of the bedrock below the surface of the ground. We use that to plan our fieldwork, which involves people going in teams out to field areas, setting up a camp, and walking on the ground collecting measurements and observations on the ground, and building a geological map.

That information is supported by laboratory work, which includes analyses that we contract out to private labs—the routine work. Then we do the more cutting-edge research at the Geological Survey of Canada labs when we need answers to very specific questions. For example, it's quite technically challenging to determine the age of rock. They're an important part of the interpretation of the map.

We also analyze surficial materials that the glaciers have left behind for clues to hidden sources of mineralization. Deposits are often covered by sand and gravel till that the glacier has left behind, and we get clues as to where those deposits are through looking at the glacial materials.

Mr. Wladyslaw Lizon: You're talking about the lab work. You have to bring samples to the lab, of course, so how do you acquire them? Do you do any core drilling to support your other methods?

Mr. John Percival: We do very little drilling. Most of the work is based on small rock samples that are cut in the lab, so we don't do any drilling in the field.

Mr. Wladyslaw Lizon: In your view, what's the accuracy of the actual finished product that you produce?

Mr. John Percival: It's difficult to assess. We publish maps at different scales. There's an implication when you have a map at a very regional scale that the accuracy is somewhat limited. The more detailed the map, the more accurate it is, but the less ground you can cover. For this program we're trying to cover large areas and get as much information as we can from them. Most of the maps we publish will be at regional scales, with somewhat limited accuracy.

For the purposes of this program, to attract industry, using those maps we can identify the geological environments where industries should dedicate their attention. We find the haystacks, the prospective zones, through that process. Then industry will pick up those prospective zones to do their detailed exploration in looking for their commodities of interest.

Mr. Wladyslaw Lizon: I think Mr. Scott mentioned that in comparison with other countries we are somewhere in the middle. You mentioned Mexico. It's kind of a surprise to me that they're way ahead of us. Can you elaborate on why they're ahead of us? What do they have better than us in geological exploration?

● (1625)

Mr. David J. Scott: In the case of Mexico, as an example, it's physically a much smaller country and it's much more logistically accessible. The Mexican government has recently—I do not have exact dates off the top of my head, but they have completed a major regional mapping program of their entire country, analogous to what we currently have under way in the GEM program.

By comparison, it's our vast territory, the relative inaccessibility, and frankly, the absolute expense of going to the unmapped or inadequately mapped parts of Canada that are preventing us from having a national scale data set that's comparable to that of other countries. We're the second largest country in the world. All of our inadequately mapped areas are in the territories effectively where it's remote, difficult, and there are short field seasons. It's a financial and logistical challenge to undertake the techniques that Dr. Percival pointed out, to do the homework, to get on the ground, to do the ground truthing to come up with those maps, which are not the best available but are adequate to support the investment decisions with sufficient precision. And the precision varies within an individual map area. Some areas are more covered by drift and we don't know with certainty where the different bedrock units are; we can infer it from the geophysical measurements. In other places, where the bedrock is well exposed, we can put our fingers on the difference between this rock type and that rock type, and we know with absolute certainty where that boundary occurs between those things.

So it really is a combination of the size and the remoteness of Canada where the remaining inadequately mapped areas are. Other countries have had perhaps a more logistically straightforward way of doing it. Australia and Mexico have both recently invested in programs similar to GEM to bring their national knowledge bases up to modern standards. We're doing the best we can now with the current five-year program.

The Chair: Thank you, Mr. Lizon.

Mr. Allen, up to five minutes. Go ahead, please.

Mr. Mike Allen (Tobique—Mactaquac, CPC): Thank you very much, Mr. Chair, and thank you to our witnesses for being here.

There are just a few areas I'd like to explore. It's on your early slides where you talk about the intersection with the provinces and the federal government and the responsibilities that each have in these areas. You talked about the provinces where you have a presence. Is there any geomapping done in the other provinces, i.e. New Brunswick or Nova Scotia? Is any of the GEM work or anything like that being done in any of those provinces?

Dr. Brian Gray: No. The provinces that I covered earlier—I'll pull that out again—for the GEM program, and remember, it was mostly 75% targeted north of 60 and then 25% in the northern part of the rest of Canada.... So south of 60 it's British Columbia, Quebec, Newfoundland and Labrador, Saskatchewan, and Manitoba.

Mr. Mike Allen: When you look at your slide and you talk about the shared responsibilities and collaborating with provinces, territories, and stakeholders and geoscience within provincial boundaries to manage natural resource development, how is this overlap done? How is that coordinated? It seems to me that resource companies would want to be able to look at an overall map for the whole country, for example. We'd want to make sure we have all those areas closed where we might have gaps. How do you coordinate that? Then, who publishes those maps so that the companies can have a big idea of what's going on in all the areas of the country?

Dr. Brian Gray: I can start on the first part of that response. As far as the actual technical collaboration is concerned, my colleagues can continue on that.

Under the intergovernmental geoscience accord that I mentioned started in 1996 and is renewed every five years, this is an accord between all of the provinces that have an interest or capacity in geological sciences. I don't know the number of other provinces that have an analog to our geological survey; my colleagues might have that information. But to address specifically what you're saying, it doesn't make sense if we all have limited resources to do our own thing; we should be pooling our activity addressing, okay, what are the priorities?

This group is governed by a national geological surveys committee. We are represented on that by our director general of the geological survey. This group reports directly to—I believe, David, there's a ministerial committee—energy and mines ministers. This group reports in. They develop work plans, they develop strategic directions, and they report in to this collective federal-provincial ministers committee.

That's at the higher level, but then on programs like GEM, we're like a targeted geoscience initiative, which we didn't present today but it's another aspect of our forward-thinking science.

David, do you want to pick up on that?

● (1630)

Mr. David J. Scott: Thank you, Mr. Chairman.

I'll answer the most straightforward question first.

All jurisdictions in Canada, with the exception of Prince Edward Island, have geological survey organizations of one form or another.

As we introduced previously, it's the intergovernmental geoscience accord that guides those bilateral or in some cases trilateral discussions between ourselves and the jurisdictional surveys as to who does what. One distinguishing factor is, effectively, scale or resolution of mapping. We do the broadly regional scale work. That work is done completely south of 60, largely. The provinces work on the next generation of detail. We can always go back and look in more detail. We can map things at the scale of this room as opposed to the scale of the city of Ottawa, for example. The provinces do the more detailed work.

The discussions take place bilaterally, between ourselves. They also occur in group when the national geological surveys committee meets twice per year.

I will build upon a point Dr. Gray has introduced. GEM is our flagship program under the northern strategy to address those areas of Canada where the basic framework mapping is not adequate to support private sector investment. We do have a suite of other geoscience programs, including a climate change geoscience program that is functioning largely in the north. We have a groundwater geoscience program that's mapping groundwater aquifers across Canada, so we're working south of 60 exclusively in that case. We have a program called the targeted geoscience initiative, which is operating dominantly south of 60, across all of the other jurisdictions on areas where there's sufficient existing knowledge that there has been significant production in various parts of those jurisdictions. That production is in decline. By working with the provincial jurisdictions, largely, and the private sector we're trying to develop new models and new exploration techniques to allow them to vector towards more deeply buried, more hidden ore deposits. So we are working from coast to coast to coast with our suite of programs. The GEM program itself is dominantly targeted north of 60.

The Chair: Thank you, Mr. Allen. Your time is up.

We go now to Mr. Stewart for up to five minutes.

Go ahead please.

Mr. Kennedy Stewart (Burnaby—Douglas, NDP): Thank you, Mr. Chair.

I'd like to thank you for your presentation.

I think this is an excellent undertaking. I support this project. I think it's essential for Canada to know what's going on underground and just above ground. I also think that more data is always better than less data, so I think it's good to know regardless of how it's used.

My questions regard the end use of this information and really how this information trickles down to not just the industry but communities that are involved.

My experience in British Columbia is that co-managed projects, especially in non-treaty areas, are often much more successful in terms of the length of time it takes them to get going, and also whether they're eventually approved or actually if they start. Something former Premier Gordon Campbell figured out and put into practice in British Columbia would be the co-managed projects.

I'm just wondering how this information gets down to first nations and Inuit communities. It's great that they have these maps that are downloaded, but then what about the end-use expertise? Is there anything in this program that helps them develop that?

The Chair: Dr. Scott, would you mind answering?

Mr. David J. Scott: Thank you. It's my pleasure.

I think we're on the same page with respect to working as locally as possible with the local stakeholders, individual communities, and jurisdictional governments. Those more local are always more informed on what the issues are, what the desires are, what some of the best practices are. We've always worked hand in hand with the jurisdictions, and we work even more closely than we have previously worked at the community level.

With the guidance of our advisory group of northerners, we've really upped our game in terms of spending time in the communities well ahead of going in on the ground, first of all to explain our intentions and what we are trying to achieve, and to hear from them how best we might plan to achieve that as well as to better understand their concerns. We can then explain some of the technical tools in our tool box. By working with communities we can plan a much better approach. We can start to generate interest from the community and perhaps even get participation with us out on the land.

Many northern communities, both first nations and Inuit, have a lot of the land skills we need, and we can bring some of their promising students with us. We bring elders from the communities out to our camps to demonstrate how we're taking care of the land while we're temporarily out there for six or eight or ten weeks in the field season.

We return to the communities. Once we have our preliminary results, we take time on the way out of the field season to close the loop with teachers in the schools to let them know a little bit about what we found out. We talk to the hamlet councils and the HTAs, the hunters and trappers associations. We can't divulge specific details. We want to wait for public, simultaneous release of that, but we absolutely let them know about the general things we found out there on the land.

We're increasingly returning to the communities during the school year to visit the schools, to bring rocks that we found in their backyard back into the community so we can show the kids who didn't come to the field with us. We're working diligently to instill in the communities the idea that beyond their traditional knowledge of the land there's accessible scientific knowledge that they can also benefit from in their land use decision-making, beyond economic decision-making.

My personal belief is that there's very little we do as scientists that can't be explained appropriately in simple terms. We can do this with school kids. We can do this with hamlet councils. We can do this with regional associations. By building that comprehension of the value of basic geoscience knowledge—and whether it's for environmental management or parks planning or investment decisions, it's that same fundamental knowledge—we can help the local people understand the knowledge we generate so they can make better decisions at their own community scale, or at the scale of their region, and the knowledge can also be used externally by the private sector. It's all the same knowledge base. It serves many decision-making masters.

● (1635)

Mr. Kennedy Stewart: Thank you.

Maybe if I have time we can talk about the ability to expand the local capacity and how, if funding was reallocated again, that might be expanded.

I'm also interested in culturally sensitive sites. I'm just wondering how those factor into your mapping. Is there any combination...or when you find these sites or they are explained to you by local knowledge, do you add these into your mapping as well? Is this something you provide to industry?

Thank you.

Mr. David J. Scott: When we're on the land, we often go to places that the local folks would not go to, because they're not necessarily where they traditionally go to hunt, for example, or to gather berries at a specific time of the year. We go to places that make them think we're sometimes kind of crazy. They might wonder why we would bother going there, and that sort of thing.

As we do this, we often come across tent rings or obviously features that had been arranged by those who had been there prior to us. They're overgrown by lichen, so we know they're ancient. Our practice is to never disturb these things. We often record them photographically. We do report back to the communities that at such and such a location we found these features that no doubt are from those who have gone before us. We do not include those features in the scientific information that we put out to the public domain. We limit that to features about the geological aspects themselves, but where we can we do return that information to the local communities. In many cases they say, “Oh yes, we knew about that one.” We often get that sort of feedback.

The Chair: Thank you, Mr. Stewart. Your time is up.

We go now to Mr. Harris for up to five minutes.

Mr. Richard Harris: Thank you, Mr. Chair.

Thank you, panel, for your input today. It's very interesting.

I just want to talk about the process of geomapping. I'm looking at page 9, and I see the helicopter with the hoop of string. Is that kind of like a LIDAR type of technology? I know they use that in the forest industry a lot. Do they use that or something similar for geomapping?

Mr. John Percival: Yes, it's a similar technique. This loop makes measurements not on the surface of the land, which LIDAR does, but it images the topography of the surface. This instrument makes measurements of, for example, magnetic properties of the rocks below the soil. The bedrock image is captured with this instrument. It flies back and forth on a regular grid, so we have a very complete picture of the bedrock. Even when we can't see the rocks, we know what's down there—at least an image of what's down there.

● (1640)

Mr. Richard Harris: On page 13 there's quite a colourful picture. I imagine this is a result of the technological picture that was taken on the fly-overs. Are these colours representative of different topography of the land, or do they identify the different types of rocks and materials that are above and in the ground?

Mr. John Percival: What you're seeing is a colour-coded image of the magnetic intensity of these rocks. The bright colours—the reds and purples—are relatively magnetic rocks and the blue colours are non-magnetic rocks. This particular map is from the previous generation of geophysical surveys that were flown in the 1970s in analog mode, so they came out as paper maps with contours on them. About 25 years ago we went through the process of digitizing all that and making it colour coded like this. So there were digital images available. However, the resolution of these was still very coarse.

Mr. Richard Harris: So page 15 would be a more up-to-date use of the technology.

Mr. John Percival: That's right. Both 14 and 15 show up-to-date images that were flown in 2009-10.

Mr. Richard Harris: I see there's a note identifying what could be a new belt of nickel potential. You can tell that by the colour that's produced from the fly-over. I guess it's a default that's built in and gives you that information.

Mr. John Percival: Not exactly. It gives us a clue as to where those units are. Once people go on the ground, they observe those rocks and determine that they're the right kinds of rocks to host nickel potential. Then you can use this kind of information to extrapolate into relatively unknown areas and say that what we saw there was purple on this map, so those purple units probably go off in that direction. That allows us to get more value from our observations; we can extend those observations out.

Mr. Richard Harris: So your work, the geomapping that your department does, is all readily accessible for people who are interested in possibly making some investments in mining, or exploring mining possibilities and mineral possibilities. They can access that.

Do you charge them a fee when they come in looking for some information on a certain area?

Mr. John Percival: No. All of the information is web accessible for free. We have a fairly sophisticated delivery system where the user can choose a box on a map of Canada and download all of that information at high resolution and then use it in his own geographic information system to make decisions.

Mr. Richard Harris: Do I have any time? Okay.

This sounds like a pretty valuable program to anybody interested in potential mining or mineral exploration. I guess the question is, how is the GEM program expected to affect future investment in Canada's northern regions? What is the realistic expectation of how the work you do is going to affect exploration? Do you see it as a real—pardon the pun—bedrock of any exploration that goes on there?

Dr. Brian Gray: I can start at a high level, and either Dr. Scott or Dr. Percival can provide a little more detail.

In southern Canada we have some experience with what every dollar spent by the Geological Survey of Canada leads to in real economic activity.

Most recently, the Prospectors and Developers Association of Canada had a consultant do a report to analyze the so-what question: you're doing this interesting science, but does it amount to anything? The rubric it developed for southern Canada is not perfect but it's the best estimate. Every dollar the GSC spends on geomapping geological survey information—there's a time lag, and it's not the next year, but it's within years after—results in $5 worth of exploration.

John used the analogy of the needle in the haystack. So with geological mapping, you've got the giant country of Canada, and these professional geologists, in the mapping process, create the haystacks at the appropriate, sufficient level. Without the haystacks, industry would find it very risky to go out and just try to prospect on its own. We identify the haystacks. That reduces the risk enough that the industry comes in and takes the risk economically to find the needle. Extrapolating that from the one to five to what that means in actual mining development—because that's just one to five on exploration—the rubric goes to $125. So every dollar spent leads to $125 worth of mining development. That one has a lot more variance in the estimate. You could take or leave that $125.

So we don't know. We're looking at southern Canada and the history there. We don't know if the one to five rubric on exploration will apply. One thing's for certain: there will be a greater lag factor, in my opinion, because there are no roads and there are no boats and planes that are readily accessible. These are vast areas, and it's difficult to get to these areas. It's very expensive, and once you get there, there's not the infrastructure. You can't stay at a hotel. You can't go from this exploration point down the road 100 kilometres in a car.

● (1645)

Mr. Richard Harris: Thank you. That's really informative.

The Chair: Thank you, Mr. Gray. Thank you, Mr. Harris.

We go now to Madame Day, for up to five minutes.

[*Translation*]

Mrs. Anne-Marie Day (Charlesbourg—Haute-Saint-Charles, NDP): Good day. Thank you for being here today.

I am amazed to see all of Canada on a single 8.5-inch by 11-inch page. But Canada is one of the world’s largest countries. I am always surprised. I suppose this is not an in-depth mapping and image to scale. It’s more of a metaphorical mapping. I have numerous questions. Because of this, I will be throwing all kinds of questions at the witnesses.

First of all, a complete mapping within the next five years, which is the allotted timeframe, will certainly prove impossible. My first question concerns depth. How far do we go? I suppose it’s not to scale. We don’t go to the centre of the earth. We have to stop somewhere. What technology is available today and how far does it allow us to go? I suppose core-drilling is a bit obsolete. Perhaps we still see some target sampling.

My second question concerns communities from a sociological point of view. Aboriginal communities have been mentioned. I'd like to talk about my father-in-law who became a businessman even though he had only completed grade seven. He devoted all of his life to his business. He could neither read nor write but people around him were willing to help.

I am also talking about agriculture. In this country, agriculture was developed because some experts were willing to help people who didn't always know what to do. The experts intervened, supported them and helped them develop their business. We know that aboriginal community members do not necessarily have the level of training that you have. Surely not. They have much to do as far as training goes. We also do not want them to be employed only in lower-end jobs as for example, in maintenance work. We want them to grow. There are young entrepreneurs among them.

A bit earlier, you spoke of guides and of individuals who were familiar with the territory. This is very interesting. How will you support them so that they can develop their own economy while taking part in it? What are the special challenges as well as the obstacles involved? I'm not talking about the weather, marine animals and other such things. What are the greatest challenges that you have to face in mapping?

Part of the program is publicly funded. We are talking about $100 million in tax money. As for pay-back for Canadians, are the companies that obtain data mostly Canadian businesses or will we be selling data to the highest bidder whatever the company? I believe there aren't many international and Canadian players in this field. I'm sorry; I'm asking a lot of questions.

This is public data. If, for example, we had a system whereby data was under lock and key, it might be more difficult for you to understand. Right now, there is a bill pending and, if I use the data, I will have to destroy it after a while. How will you inform operators and companies so that they can have access to this data?

Concerning the development of the far north—

● (1650)

[*English*]

The Chair: Yes, the bells are ringing. We're just finding out what the vote is about and I'll let you know.

Continue, please, Madam Day.

[*Translation*]

Mrs. Anne-Marie Day: Mr. Chair, will you be allowing a few more minutes so that I may finish or are we going to vote?

[*English*]

Mr. David McGuinty: A point of order, Mr. Chair.

The Chair: Mr. McGuinty, go ahead.

Mr. David McGuinty: I didn't think it was discretionary. I thought as soon as the bells began ringing it was mandatory to suspend the work of the committee, unless you have the unanimous consent of all members of the committee.

The Chair: I've never heard of a rule like that, but we can find out.

Apparently there is a vote, so unfortunately we will have to suspend the meeting. There's probably no point in coming back.

But could we quickly deal with the budget for witnesses to come in the future? It would take two minutes or so.

[*Translation*]

Mrs. Anne-Marie Day: Will the witnesses be coming back?

[*English*]

The Chair: It's a 30-minute bell. We want to get going, but we have a budget proposed. It's a tentative budget for witness expenses for this study, and the total amount of the budget—we have it broken down—is $73,000.

Is there need for further discussion on that? Do you want to see it? Do you want to just approve the budget?

An hon. member: No, I'd like to see it.

The Chair: Okay. We're not going to be able to deal with it now.

On a point of order, Mr. Trost.

Mr. Brad Trost: If the members would be fine with it, I would suggest that we let Madam Day finish her round. It's only two more minutes. If she wants to finish her round, we would have a complete round, if all members are in agreement with that.

Do you mind if she finishes, David?

The Chair: Okay, apparently we do need unanimous consent to continue. Mr. McGuinty is not willing to offer that consent, I understand.

Mr. David McGuinty: I'm being convened by my whip. I have to go.

The Chair: Okay. We had better stick with that.

What about, quickly, the budget?

Mr. Claude Gravelle: Can we get a breakdown of the budget? Are these witnesses going to come back so we can finish?

The Chair: The committee can discuss that. We can't do it right now.

Mr. Claude Gravelle: We can invite them back. We can. We will.

The Chair: It's a very interesting session. With witnesses, the committee can choose to do as it pleases.

Mr. Claude Gravelle: Can we do that now or do we have to do it—

The Chair: No, we can't do it now. We have to go now. We don't have unanimous consent.

I would like to thank the witnesses very much for their input here today. Obviously, there is a great deal of interest in this.

I thank all the committee members for their questions, and we'll have to deal with the budget at the next meeting.

The meeting is adjourned.

Published under the authority of the Speaker of the House of Commons

SPEAKER'S PERMISSION

Additional copies may be obtained from: Publishing and Depository Services
Public Works and Government Services Canada
Ottawa, Ontario K1A 0S5
Telephone: 613-941-5995 or 1-800-635-7943
Fax: 613-954-5779 or 1-800-565-7757
publications@tpsgc-pwgsc.gc.ca
http://publications.gc.ca

Also available on the Parliament of Canada Web Site at the following address: http://www.parl.gc.ca

Publié en conformité de l'autorité du Président de la Chambre des communes

PERMISSION DU PRÉSIDENT

On peut obtenir des copies supplémentaires en écrivant à : Les Éditions et Services de dépôt
Travaux publics et Services gouvernementaux Canada
Ottawa (Ontario) K1A 0S5
Téléphone : 613-941-5995 ou 1-800-635-7943
Télécopieur : 613-954-5779 ou 1-800-565-7757
publications@tpsgc-pwgsc.gc.ca
http://publications.gc.ca

Aussi disponible sur le site Web du Parlement du Canada à l'adresse suivante : http://www.parl.gc.ca